OBSERVATIONS ON RHOPALOMYIA CALIFORNICA FELT
(Diptera: Itonididae)

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GALLS: This species forms many-chambered galls on the plant terminals; a few single-chambered galls on the leaves seem also to be made by it. The host is chaparral broom (*Baccharis pilularis* D. C.), both the prostrate coastal subspecies *typica* C. B. Wolf, and the erect inland subspecies *consanguinea* D. C.

Sectioned and stained galls show a matrix of parenchyma-type cells that forms the mass of the gall. The larval chambers are tubular, closed distally and of mechanical tissue. This tissue is absent distally and apparently also inwardly, though this is less certain.

Cross sections show numerous small vascular bundles, the apparent medium of food and water exchange for the gall. These bundles appear to be those of the petioles and veins of the undeveloped leaves that are involved in the gall. This conclusion is based on two considerations: first, that the bundles are concentrically arranged as in the bud, and second, that the xylem is internal and the phloem external as in the petioles of normal leaves.

The epidermis of the gall is composed of from one to three, usually two, layers of cells. The larval chambers are closed distally by a few layers of cells. No open chambers with developing larvae were found.

EGGS: Eggs are laid on the terminals, usually on the buds. The newly hatched larvae enter between the bud scales, by pushing in between the unopened leaves. No gall is formed until after the larvae enter, so it is concluded that the stimulus for gall formation is the entry of the larvae and not oviposition. Oviposition is largely external, and apparently eggs are not inserted into the tissue, although they may be placed under partly opened leaves.

LARVAE: Minute larvae may crawl for some distances, apparently at random. By no means do all of the young larvae gain entry; many wander until they die. Oviposition is profuse but galls are relatively few-chambered. The mortality rate of young larvae is high; only a few become established. The communal galls seem to be a random result, caused by the entry of several larvae into one bud. The gall that is stimulated by this mass entry eventually en-

velopes all the larvae in any given bud. The concentric arrangement of the chambers of the gall seems to evolve from the concentric arrangement of the bud leaves.

Since the galls are closed, the suggestion is made that the larvae obtain oxygen through or from the tissues of the plant. Superficial tissues of the galls are rich in chloroplasts, and a possible explanation (by no means proven) is that the oxygen that results from photosynthesis may enter the larval chambers. Further plausibility is furnished by the fact that the cells closing the galls are photosynthetic.

Larvae face the inner end of the chamber. The method of obtaining nourishment is not clear. The mechanical structure of the gall and the structure of the larvae suggests that food is liquid in nature. Observations begun by another observer to clear up this point have not to date led to any conclusion.

Prior to pupation, the larva turns in the cell and faces outward. This was not observed in fact, but since the developing larvae face inward while the pupae face outward, such a turning must occur. Because of the opacity of the galls, and their tendency to wither, no accurate information was obtained as to number of larval instars and length of pupal period, but indications are that the instars are few and the pupal period short.

PUPAE: The pupa is equipped with a cephalic projection which serves to push through the cells that close the chamber. The pupa appears at the outer end of the cell and gradually protrudes. Protrusion continues until but a few abdominal segments remain in the cell. Then the pupal skin splits irregularly and the adult emerges. Emergence is at first without evident movement, the adult slowly squeezing out by translocation of body fluids, by ingestion of air, or by both. When the adult is far enough out to free any appendages, these are moved slowly and soon become functional. Frequently adults crawl onto the gall to sit while their tissues harden. Emergence takes but a few minutes. The pupal skin remains hanging to the gall.

ADULTS: Newly emerged adults mate almost at once. Mating is brief. Males are short lived. In a typical instance, mating occurred at 9:00 A. M. and the male died at 12:20 P. M. This male had

emerged at 8:00 A. M. and so had an adult life span of four hours and twenty minutes.

Newly emerged females are distended with eggs. The vermillion colored eggs give the abdomen of the female an orange color. After oviposition, the female is slender in form and dusky in color. Oviposition is rapid and begins soon after mating. While eggs are mostly laid on the tips, some may be laid at some distance down the stems. In nine instances, the average number of eggs was 146, but in each case unlaid eggs remained. Dissections of three females just prior to egg laying showed an average of 279 eggs in the abdomens. It would appear that this maximum number is seldom laid. This tendency not to lay all of the eggs that are developed appears to be common to many species of insects of diverse orders.

The gut of adults of this fly is greatly reduced and appears to be non-functional. None was seen to pass any excrement.

The life span of the female exceeds that of the male, the longest survival time observed being fifty-two hours. The mouthparts seem to perform no function; none was observed to take either food or water.

PARASITES: This fly is heavily parasitized. The following parasites were reared: *Torymus baccharidis* (Huber); *Amblymerus* n. sp., *Eupelmus inyoensis* Girault *Eupelmus* sp., *Tetrastichus* sp., *Platygaster* sp. Some of these are undoubtedly secondary, but their exact status is at present not known.

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LEPIDOPTERISTS' SOCIETY

It is with great interest that we note the organization of the Lepidopterists' Society. Installed as officers were J. H. McDunnough as president, A. H. Clark as senior vice-president, J. B. Ziegler as treasurer, and F. H. Rindge as secretary. The society held its first annual meeting in New York on December 29th and 30th and certain aspects of the meeting have been reviewed in the New Yorker magazine for January 13, 1951. Those interested in membership or in additional information should address their communications to Dr. F. H. Rindge, Department of Insects & Spiders, American Museum of Natural History, Central Park West at 79th Street, New York 24.—PAUL D. HURD, JR.